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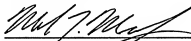
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in the following listed application(s) or patent(s) for which the issue fee has been paid.

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Respectfully Submitted,



Mark J. Murphy  
Registration No. 34,225  
Date: May 29, 2009

COOK ALEX Ltd.  
200 West Adams Street  
Suite 2850  
Chicago, Illinois 60606  
(312) 236-8500

Customer No: 26568



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(12) **United States Patent**  
Nakashima et al.(10) **Patent No.:** US 7,476,451 B2  
(45) **Date of Patent:** Jan. 13, 2009(54) **ELECTROLUMINESCENT ELEMENT AND LIGHT EMITTING DEVICE**(75) **Inventors:** Harue Nakashima, Kanagawa (JP);  
Satoshi Seo, Kanagawa (JP); Takako  
Takasu, Kanagawa (JP); Hiroko  
Yamazaki, Kanagawa (JP)(73) **Assignee:** Semiconductor Energy Laboratory  
Co., Ltd. (JP)(\*) **Notice:** Subject to any disclaimer, the term of this  
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U.S.C. 154(b) by 0 days.(21) **Appl. No.:** 10/715,106(22) **Filed:** Nov. 17, 2003(65) **Prior Publication Data**  
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**H01L 51/50** (2006.01)(52) **U.S. Cl.** ..... 428/690; 428/917; 313/504;  
313/506(58) **Field of Classification Search** ..... 428/690,  
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See application file for complete search history.(56) **References Cited****U.S. PATENT DOCUMENTS**5,405,709 A \* 4/1995 Littman et al. .... 428/690  
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*Primary Examiner*—Dawn Garrett  
*Attorney, Agent, or Firm*—Cook Alex Ltd.(57) **ABSTRACT**

There is provided an electroluminescent element using a material that is excellent in film forming properties and carrier transporting properties, emits a light in the solid state, and can be suitably used also as a host material. The electroluminescent element has an electroluminescence layer between a couple of electrodes, and a complex of a Group 4 metal of the periodic table, which is excellent in the film forming properties and the carrier transporting properties and capable of emitting a light in the solid state, is used in a part of the electroluminescence layer to form the electroluminescent element. The complex of a Group 4 metal of the periodic table has an emission wavelength on a longer wavelength side as compared with conventional host materials such as Alq<sub>3</sub>, and thereby may be combined with a red light emitting guest material to form a light emitting layer.

**16 Claims, 12 Drawing Sheets**